

LIVERMORE LAB REPORT

A weekly review of scientific and technological achievements from Lawrence Livermore National Laboratory, May 28-31, 2013.

NATURE WORLD NEWS ALKA SELTZER FOR THE SEA



Livermore scientists have discovered a new method that may save the world's marine ecosystems by offsetting ocean acidification.

When Lawrence Livermore scientists discovered and demonstrated a new technique to remove and store atmospheric carbon dioxide while generating carbon-negative hydrogen, they also came up with a method that can be used to offset ocean acidification.

The researchers believe that the carbonate and bicarbonate produced in the saline water electrolysis could be used to mitigate ongoing ocean acidification the same way Alka Seltzer neutralizes excess acid in the stomach.

The team demonstrated, at a laboratory scale, a system that uses the acidity normally produced in saline water electrolysis to accelerate silicate mineral dissolution while producing hydrogen fuel and other gases. The resulting electrolyte solution was shown to be significantly elevated in hydroxide concentration that in turn proved strongly absorptive and retentive of atmospheric CO₂.

To read more, go to [Nature World News](#).



The Sequoia supercomputer housed at LLNL.

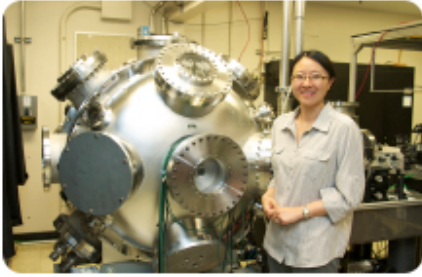
Among the projects threatened by federal budget cuts is U.S. development of an exascale computer, a system that would be roughly 1,000 times more powerful than today's supercomputers.

Last week, some of the leading U.S. supercomputing researchers told a House energy subcommittee hearing that China, Japan and Europe are investing heavily in building next-generation systems and may beat the United States in the race to exascale.

The U.S. national laboratories run by the Department of Energy use the largest systems, in part to meet their mission to keep track of the nation's nuclear weapons stockpile. "It's very important that the United States maintain the key intellectual property" for supercomputers, said Dona Crawford, associate director for Computation at Lawrence Livermore. "If we control that, we have the high ground.

"I would not want to cede that to another country," Crawford added. "I cannot trust U.S. nuclear weapons technology to a system built in China, say. That's untenable."

To read more, go to [Computerworld](http://Computerworld.com).



Yuan Ping stands next to the target chamber in the Europa laser bay, part of the Jupiter Laser Facility.

Lawrence Livermore physicist Yuan Ping has been selected as a recipient of a Department of Energy Office of Science Early Career Research Program (ECRP) award. These awards provide \$2.5 million over five years to support the development of individual research programs of outstanding scientists early in their careers and stimulate research careers in disciplines supported by the DOE Office of Science.

Ping was selected for her project that aims to provide high-quality data on critical energy transport properties of high-energy-density (HED) matter. According to Ping, transport processes, such as thermal and electrical conduction, radiation, viscosity, electron on equilibration and particle stopping, determine the mechanisms and rates of energy transfer and redistribution within HED matter.

The data also will impact many other fields where HED science plays a crucial role, such as studies of geophysical phenomena, planetary formation and astrophysical objects.

LLNL has an established history of researchers receiving this honor -- Ping is the 10th recipient since the program's inception in 2010.

To read more, go to phys.org.



THE GREAT PITCH



A schematic of the Livermore Valley Open Campus project.

Nineteen entities pitched ideas to Lawrence Livermore on how to develop 78 acres of land at the Lab.

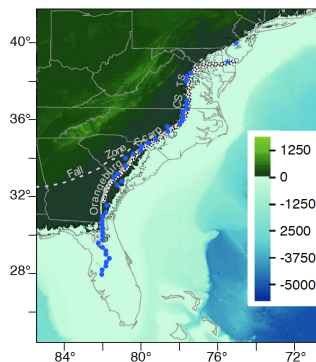
The land is part of the LLNL and Sandia National Laboratories' Livermore Valley Open Campus project to facilitate businesses to make use of the labs' research and technology.

Last month, LLNL issued a request for information from developers interested in building facilities such as office and lab space at the open campus.

"It's taken some time, but we're really excited that the Department of Energy approved our going forward to find developers," said Buck Koonce, a senior adviser at LLNL working on the open campus project.

To read more, go the [San Francisco Business Times](#).

innovations report TRACKING THE EARTH'S MANTLE



The East Coast shoreline as it may have appeared 3 million years ago.

From Virginia to Florida, there is a prehistoric shoreline that, in some parts, rests more than 280 feet above modern sea level. The shoreline was carved by waves more than 3 million years ago -- possible evidence of a once higher sea level, triggered by ice-sheet melting.

But new findings by a team of researchers, including Lawrence Livermore's Nathan Simmons, reveal that the shoreline has been uplifted by more than 210 feet, meaning less ice melted than expected.

The shoreline is not flat, as it should be, but is distorted, reflecting the pushing motion of the Earth's mantle.

To read more, go to [Innovations](#).

LLNL applies and advances science and technology to help ensure national security and global stability. Through multi-disciplinary research and development, with particular expertise in high-energy-density physics, laser science, high-performance computing and science/engineering at the nanometer/subpicosecond scale, LLNL innovations improve security, meet energy and environmental needs and strengthen U.S. economic competitiveness. The Laboratory also partners with other research institutions, universities and industry to bring the full weight of the nation's science and technology community to bear on solving problems of national importance. To send input to the *Livermore Lab Report*, send [e-mail](#).